What is claimed is:

1. A method of detecting and tracking targets, comprising:

capturing sequential images of a scene;

performing motion detection analysis on pairs of the sequential images to detect targets within the scene;

obtaining level set contours for the pairs of the sequential images, the level set contours corresponding with target boundaries of the detected targets;

applying a spatial transformation to the level set contours to expand the level set contours to a lower energy level;

performing the motion detection analysis for subsequent pairs of the sequential images using the expanded contours; and

extracting time and motion analysis data from the level set contours for the subsequent pairs of sequential images to track the detected targets.

2. The method of claim 1, comprising:

analyzing one image of each pair of sequential images to obtain static target boundaries; and

combining the static target boundaries with the target boundaries to obtain the level set contours.

3. The method of claim 2, wherein analyzing the one image comprises applying an intensity-

based diffused edge detection scheme to the one image.

4. The method of claim 1, wherein obtaining level set contours comprises:

obtaining an objective function; and

minimizing the objective function.

5. The method of claim 1, wherein performing the motion detection analysis comprises determining an interframe difference between the sequential images of each pair of sequential images.

6. The method of claim 5, comprising:

using a Bayesian model on the interframe difference to obtain an interframe difference density function; and

providing static and mobile regimes based on the interframe difference density function.

7. The method of claim 1, wherein applying the spatial transformation comprises:

determining a percentage of the expanded contours corresponding to the level set contours for the subsequent pairs of sequential images; and

applying the spatial transformation when the percentage exceeds a predetermined value.

8. The method of claim 7, comprising:

analyzing one image of each pair of sequential images to obtain static target boundaries; and

combining the static target boundaries with the target boundaries to obtain the level set contours.

9. The method of claim 8, wherein analyzing the one image comprises applying an intensity-based diffused edge detection scheme to the one image.

10. The method of claim 8, wherein extracting time and motion analysis data comprises:

determining object-oriented representations for the level set contours; and

applying geometric transformations to coordinates of the object-oriented representations.

11. The method of claim 10, comprising:

extracting bearing and bearing rates from centroid parameters of the object-oriented representations; and

extracting range and range rate data from curvature characteristics of the object-oriented representations.

12. The method of claim 11, wherein the curvature characteristics include length scale, width scale, mean curvature and temporal derivatives thereof.

13. The method of claim 10, wherein obtaining level set contours comprises:

obtaining an objective function; and

minimizing the objective function.

14. The method of claim 13, wherein performing the motion detection analysis comprises

determining an interframe difference between the sequential images of each pair of sequential images.

15. The method of claim 14, comprising:

using a Bayesian model on the interframe difference to obtain an interframe difference density function; and

providing static and mobile regimes based on the interframe difference density function.

16. The method of claim 1, wherein extracting time and motion analysis data comprises:

determining object-oriented representations for the level set contours; and

applying geometric transformations to coordinates of the object-oriented representations.

17. The method of claim 16, comprising:

extracting bearing and bearing rates from centroid parameters of the object-oriented representations; and

extracting range and range rate data from curvature characteristics of the object-oriented representations.

18. The method of claim 17, wherein the curvature characteristics include length scale, width scale, mean curvature and temporal derivatives thereof.

19. The method of claim 17, comprising presenting the time and motion analysis data to an operator.

20. A system for detecting and tracking targets, comprising:

an imager to provide sequential images of a scene;

a differencer to calculate interframe differences between pairs of the sequential images.

a feature boundary detection module processing the interframe differences to provide motion detection boundaries of the targets within the scene;

a level set processor to process the motion detection boundaries to obtain level set contours;

an adaptive control to spatially transform the level set contours to a lower energy level to provide expanded contours to the feature boundary detection module for processing interframe differences of subsequent pairs of sequential images; and

a target motion analyzer to extract time and motion data from the level set contours for the subsequent pairs of sequential images to track the targets within the scene.

21. The system of claim 20, wherein the feature boundary detection module comprises:

a Bayesian model analyzer to obtain an interframe difference density function;

a regime processor to partition the interframe difference density function into static and mobile regimes; and

an objective function processor to combine the static and mobile regimes to obtain an objective function representing the motion detection boundaries.

22. The system of claim 21, comprising a stationary target detector to provide static target

boundaries, the objective function processor combining the static target boundaries with the static regime.

23. The system of claim 22, wherein the level set processor comprises a gradient descent processor to minimize the objective function.

24. The system of claim 23, comprising an output module to present the time and motion data to an operator of the system.

25. The system of claim 21, wherein the level set processor comprises a gradient descent processor to minimize the objective function.

26. The system of claim 20, comprising:

a stationary target detector to provide static target boundaries; and

an objective function processor to combine the static target boundaries with the motion detection boundaries.

27. The system of claim 20, comprising an output module to present the time and motion data to an operator of the system.

28. A method of improving detection and tracking of targets from video image data of a scene, wherein the targets are detected by performing motion detection analysis on pairs of sequential image data and extracting time and motion analysis data from level set contours for the pairs of sequential image data, the method comprising:

applying a spatial transformation to the level set contours to expand the level set contours

to a lower energy level; and

performing the motion detection analysis for subsequent pairs of the sequential images using the expanded contours.

29. The method of claim 28, wherein applying the spatial transformation comprises:

determining a percentage of the expanded contours corresponding to the level set contours for the subsequent pairs of sequential images; and

applying the spatial transformation when the percentage exceeds a predetermined value.

30. The method of claim 28, comprising:

analyzing one image of each pair of sequential images to obtain static target boundaries; and

combining the static target boundaries with the expanded contours prior to performing the motion detection analysis for subsequent pairs of the sequential images.

31. A computer program, disposed on a computer readable medium, for providing detection and tracking of targets, the computer program including instructions for causing a processor to:

capture sequential images of a scene;

perform motion detection analysis on pairs of the sequential images to detect the targets within the scene;

obtain level set contours for the pairs of the sequential images, the level set contours corresponding with boundaries of the targets within the scene;

apply a spatial transformation to the level set contours to expand the level set contours to a lower energy level;

perform the motion detection analysis for subsequent pairs of the sequential images using the expanded contours; and

extract time and motion analysis data from the level set contours for the subsequent pairs of sequential images to track the targets within the scene.

32. The computer program of claim 31, wherein the instructions to apply the spatial transformation include instructions for causing the processor to:

determine a percentage of the expanded contours corresponding to the level set contours for the subsequent pairs of sequential images; and

apply the spatial transformation when the percentage exceeds a predetermined value.

33. The computer program of claim 32, including instructions for causing the processor to:

analyze one image of each pair of sequential images to obtain static target boundaries; and

combine the static target boundaries with the target boundaries to obtain the level set contours.

34. The computer program of claim 33, wherein the instructions to analyze the one image include instructions for causing the processor to apply an intensity-based diffused edge detection scheme to the one image.

35. The computer program of claim 33, wherein the instructions to extract time and motion analysis data include instructions for causing the processor to:

determine object-oriented representations for the level set contours; and

apply geometric transformations to coordinates of the object-oriented representations.

36. The computer program of claim 35, including instructions for causing the processor to:

extract bearing and bearing rates from centroid parameters of the object-oriented representations; and

extract range and range rate data from curvature characteristics of the object-oriented representations.

37. The computer program of claim 36, wherein the curvature characteristics include length scale, width scale, mean curvature and temporal derivatives thereof.

38. The computer program of claim 35, wherein the instructions to obtain level set contours include instructions for causing the processor to:

obtain an objective function; and

minimize the objective function.

39. The computer program of claim 38, wherein the instructions to perform the motion detection analysis include instructions for causing the processor to determine an interframe difference between the sequential images of each pair of sequential images.

40. The computer program of claim 39, including instructions for causing the processor to:

obtain an interframe difference density function from the interframe difference using a Bayesian model; and

provide static and mobile regimes based on the interframe difference density function.

41. The computer program of claim 39, including instructions for causing the processor to present the time and motion analysis data to an operator.